PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2H/SC/2BC39/8	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/BE2004/000084	International filing date *(day/month/year)* 10.06.2004	Priority date *(day/month/year)* 13.06.2003
International Patent Classification (IPC) or national classification and IPC E02F3/92		
Applicant DREDGING INTERNATIONAL N.V.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 2 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
12.01.2005	19.09.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Sheppard, B Telephone No. +31 70 340-3662

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/BE2004/000084

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages	
1-11	as originally filed
Claims, Numbers	
1-10	as amended (together with any statement) under Art. 19 PCT
Drawings, Sheets	
1/6-6/6	as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	2-7,10
	No:	Claims	1,8,9
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-10
Industrial applicability (IA)	Yes:	Claims	1-10
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

1) Documents

The following documents are referred to in this communication:

D1 : US 2 002 749 A (NEVELING SR ALOYS) 28 May 1935 (1935-05-28)
D2 : NL 7 408 623 A (IHC HOLLAND NV) 30 December 1975 (1975-12-30)

2) Novelty

2.1) Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parenthesis applying to this document):

Device for dislodging and recovering dredging material of varying nature, comprising a bearing housing (29), a drive shaft (24) mounted therein for rotatingly driving with a determined torque a cutter head (15) is mountable on the drive shaft via a hub (35), and a suction pipe (25) which can be connected to a suction mouth (30a) which is surrounded by a fixed cutter shield (30c, 30f) which fills the space between the rotating support ring (39, 45) on the one side and the suction mouth and the bearing housing on the other, wherein a number of cutter heads (15a, 15b) with a different support ring diameter can be mounted via the same hub on the drive shaft, and wherein the support ring diameter is determined by the torque and the nature of the dredging material to be recovered.

2.2) Although not explicitly disclosed in D1 it is clear that the skilled man would select the appropriate diameter of cutter head (and hence support ring diameter) for the material to be dredged, therefore the determination of the support ring diameter is considered to be implicit in the device disclosed in D1.

2.3) Note that it is clearly stated (see description, page 2, left-hand column, line 73 to right-hand column, line 31) that the two sections of the cutter (15a, 15b) can be separated. This therefore allows the mounting of only section 15a (which has a support ring (39) with a small diameter) or both sections 15a and 15b (which has a support ring (45) with a large diameter). Thus "a number of cutter heads (15a, 15b) with a different support ring diameter *can be mounted* on the drive shaft". It is noted that whether using section 15a only or 15a and 15b together, the head is mounted to the drive shaft via the same hub (35).

2.4) D1 therefore discloses all claimed features of claim 1, and the subject-matter of claim

1 is thus not novel (Article 33(2) PCT).

2.5) D1 also discloses the subject matter of independent claims 8 and 9.

3) Inventive Step

3.1) Dependent claims 2-7 and 10 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

3.2) In claims 2-5 and 10 slight constructional changes in the device of claims 1 and 9 respectively are defined which come within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of these claims lacks an inventive step.

3.3) The features of dependent claims 6 and 7 have already been employed for the same purpose in a similar device, see document D2, page 3, lines 19-21, and figure 1, which disclose that the cutter is mounted on hollow shaft (2) , which is used as a spray device. It would therefore be obvious to the person skilled in the art, to apply these features with corresponding effect to a device according to document D1, thereby arriving at a device according to claims 6 and 7.

CLAIMS

1. Device for dislodging and recovering dredging material of varying nature, comprising a bearing housing, a drive shaft mounted therein for rotatingly driving with a determined torque a cutter head with a support ring, which cutter head is mountable on the drive shaft via a hub, and a suction pipe which can be connected to a suction mouth which is surrounded by a fixed cutter shield which fills the space between the rotating support ring on the one side and the suction mouth and the bearing housing on the other, **characterized in that** a number of cutter heads with a different support ring diameter can be mounted via the same hub on the drive shaft, wherein the support ring diameter is determined by the torque and the nature of the dredging material to be recovered.

2. Device as claimed in claim 1, **characterized in that** a number of suction mouths with a different entry section can be connected to the suction pipe, wherein the entry section is determined by the nature of the dredging material to be recovered.

3. Device as claimed in claim 2, **characterized in that** the dimensions of the suction mouth are adapted such that in the operative position the bottom end fits closely between the cutter shield and the support ring of the associated cutter head.

4. Device as claimed in either of the claims 2-3, wherein the device further comprises a cutter ladder, **characterized in that** a number of cutter shields can be mounted on the cutter ladder which, during use of different cutter head/suction mouth combinations, allow the cutter shield to be connected on one side to the edge of the bearing housing and the suction mouth and on the other side to the

inner edge of the support ring and the front end of the cutter ladder.

5. Device as claimed in any of the claims 2-4, wherein the cutter shield takes the form at the bottom of a truncated cone in the direction of the cutter head, **characterized in that** the smaller the support ring diameter of the cutter head to be mounted, the greater is the angle of opening of the truncated cone of the cutter shield to be mounted.

6. Device as claimed in any of the foregoing claims, **characterized in that** at least one nozzle is provided for spraying a fluid under high pressure into the dredging material cut into by the cutter head.

7. Device as claimed in claim 6, **characterized in that** the drive shaft takes a hollow form in order to form a channel for the fluid under pressure, wherein the at least one nozzle is mounted on the outer end of the drive shaft connected to the cutter head.

8. Cutter suction dredger for dislodging and recovering dredging material, comprising a device as claimed in any of the foregoing claims.

9. Method for dislodging and recovering dredging material using a device as claimed in any of the foregoing claims, **characterized in that** the diameter of the support ring of the cutter head is selected as a function of the dredging material to be recovered and the torque, wherein a smaller diameter is selected for a harder material, and that the selected cutter head is connected to the drive shaft.

10. Method as claimed in claim 9, **characterized in that** a suction mouth with a determined entry section is selected as a function of the dredging material to be recovered, wherein a smaller entry section is selected for a harder dredging material, and the selected suction mouth is connected to the suction pipe.